



installation, start-up and service instructions

COMMERCIAL AIR-COOLED CONDENSING UNITS

**569C
576B**

Cancels: II 569C-72-4

II 569C-72-5
8/15/00

IMPORTANT — READ BEFORE INSTALLING

1. Read and become familiar with these installation instructions before installing this unit (Fig. 1).
2. Be sure the installation conforms to all applicable local and national codes.
3. These instructions contain important information for the proper maintenance and repair of this equipment. Retain these instructions for future use.

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SAFETY CONSIDERATIONS

⚠ WARNING: Improper installation, adjustment, alteration, service, maintenance, or use can cause explosion, fire, electric shock, or other occurrences which may injure you or damage your property. Consult a qualified installer or service agency for information or assistance. The qualified installer or agency must use only factory-authorized kits or accessories when repairing this product.

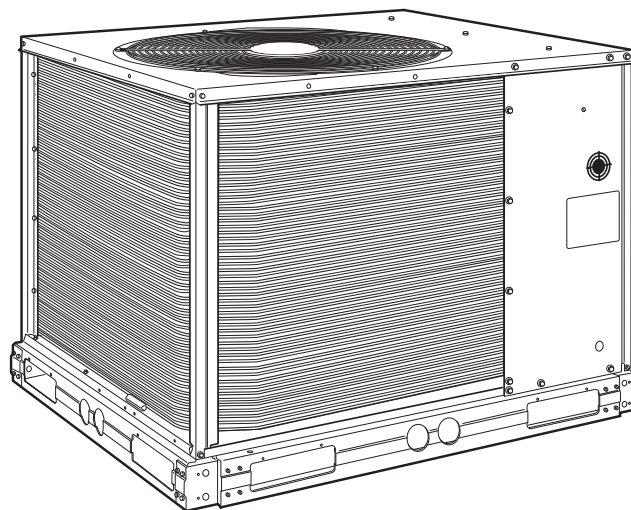


Fig. 1 — Typical Unit (569C072 Shown)

Recognize safety information. This is the safety-alert symbol. (⚠) When you see this symbol on the unit and in instructions or manuals, be alert to the potential for personal injury.

Understand the signal words — DANGER, WARNING, and CAUTION. These words are used with the safety-alert symbol. Danger identifies the most serious hazards which will result in severe personal injury or death. Warning indicates a condition that could result in personal injury. Caution is used to identify unsafe practices which would result in minor personal injury or product and property damage.

⚠ WARNING: Before performing service or maintenance operations on unit, turn off main power switch to unit. Electrical shock could cause personal injury.

1. The power supply (volts, hertz, and phase) must correspond to that specified on unit rating plate.
2. The electrical supply provided by the utility must be sufficient to handle load imposed by this unit.
3. Refer to the Locate the Unit section on page 2 and Fig. 2 and 3 for locations of electrical inlets, required clearances, and weight distribution based on recommended support points before setting unit in place.
4. This installation must conform with local building codes. Refer to local plumbing or wastewater codes and other applicable local codes.

INSTALLATION

NOTE: When installing any accessory item, see the manufacturer's installation instructions packaged with the accessory. A qualified agency must use factory-authorized kits or accessories when modifying this unit.

The 569C072,090, and 120 units use hermetic compressors. The 576B090,102, and 120 units use semi-hermetic compressors. Refer to Table 1.

NOTE: If vibration isolators are required for a particular installation, use corner weight information in Fig. 2 to make proper selection.

I. LOCATE THE UNIT

A. Clearance

Maintain clearance around and above unit to provide minimum distance from combustible materials, proper airflow, and service access. Refer to Fig. 2.

Minimum clearance (local codes or jurisdiction may prevail):

- a. Bottom to combustible surfaces 0 inches.
- b. Condenser coil, for proper airflow, 36 in. one side, 12 in. the other. The left or rear side receiving the greater clearance is optional.
- c. Overhead, 60 in. to ensure proper condenser fan operation.
- d. Between units, control box side, 42 in. per NEC (National Electrical Code).
- e. Between unit and ungrounded surfaces, control box side, 36 in. per NEC.
- f. Between unit and block or concrete walls and other grounded surfaces, control box side, 42 in. per NEC.

Although unit is weatherproof, guard against water from higher level runoff and overhangs.

Slab-mounted units should be at least 4 in. above the highest expected water level (flood and runoff). Do not use the unit if it has been under water.

II. RIG AND PLACE UNIT

Inspect unit for transportation damage. File any claim with transportation agency. Keep unit upright and do not drop. Spreader bars are not required if top crating is left on unit. Rollers may be used to move unit across a roof. Level by

using unit frame as a reference. See Table 1 and Fig. 3 for additional information. Operating weight is shown in Table 1.

These units are designed for overhead rigging only. Rig with packaging assembly and wood bumper strips in place to prevent unit damage by rigging cable. As further protection for coil faces, plywood sheets may be placed against sides of unit, behind cables. Run cables to a central suspension point so that angle from the horizontal is not less than 45 degrees. Raise and set unit down carefully.

If it is necessary to roll unit into position, mount unit on longitudinal rails, using a minimum of 3 rollers. *Apply force to rails, not unit.* If unit is to be skidded into position, place it on a large pad and drag it by the pad. *Do not apply any force to unit.*

Raise from above to lift unit from rails or pad when unit is in final position.

Lifting holes are provided in base rails as shown in Fig. 3. Refer to rigging instructions on unit.

IMPORTANT: If unit has forklift protection skids, be sure to remove forklift protection skids from under unit before setting unit in place.

After unit is in position, remove shipping materials and rigging skids.

III. COMPRESSOR MOUNTING

Semi-hermetic compressors are shipped from the factory held down by 4 bolts. After unit is installed, loosen each bolt until the snubber washer can be moved with finger pressure (576B units only). See Fig. 4.

IV. UNIT REFRIGERANT PIPING CONNECTIONS

Suction connections and liquid connection are sweat fittings. Refer to Table 2 for refrigerant piping sizes. Follow standard piping practices.

A. Size Refrigerant Lines

Consider length of piping required between condensing unit and evaporator, amount of liquid lift, and compressor oil return. See Table 3 for design details and line sizing. Refer to evaporator installation instructions for additional information.

Table 1 — Physical Data

UNIT	569C072	569C090	569C120	576B090	576B102	576B120
NOMINAL CAPACITY (tons)	6	7 ¹ / ₂	10	7 ¹ / ₂	8 ¹ / ₂	10
OPERATING WEIGHT (lb) Aluminum Coils (Std) Copper Coils (Optional)	340 386	392 460	426 503	510 578	564 632	564 632
RIGGING WEIGHT (lb) Aluminum Coils (Std) Copper Coils (Optional)	390 436	420 488	445 522	560 628	614 682	614 682
REFRIGERANT* Operating Charge† Typical (lb) Shipping Charge (lb)	R-22					
	11.4 2.0	13.6 2.0	16.5 2.0	14.3 2.0	16.4 2.0	16.4 2.0
COMPRESSOR	Reciprocating, Hermetic	Scroll, Hermetic		Reciprocating, Semi-Hermetic		
Qty...Type	1...H26A72Q	1...ZR94KC	1...ZR125KC	1...06DA818	1...06DA824	1...06DH824 (See Note)
Qty Cylinders (ea)	2	NA	NA	4	6	6
Speed (rpm)	3500	3500	3500	1750	1750	1750
Oil Charge (oz) (ea)	65	85	110	88	128	128
CONDENSER AIR FAN	Propeller; Direct Drive					
Qty...Rpm	1...850	1...1100	1...1100	1...1100	1...1100	1...1100
Diameter (in.)	26	26	26	26	26	26
Motor Hp (NEMA)	1/3	3/4	3/4	3/4	3/4	3/4
Watts	444	976	960	930	930	930
Nominal Cfm Total	3800	6500	7000	6500	6500	6500
CONDENSER COIL	Enhanced Copper Tubes, Aluminum Lanced Fins					
Rows...Fins/in.	2...17					
Face Area (sq ft)	12.24	18.0	20.50	18.0	18.0	18.0
Storage Capacity (lb)**	11.26	16.56	18.87	16.56	16.56	16.56
CONNECTIONS (sweat)						
Suction (in.)	1 ¹ / ₈	1 ¹ / ₈	1 ¹ / ₈	1 ¹ / ₈	1 ¹ / ₈	1 ¹ / ₈
Liquid (in.)	1 ¹ / ₂	1 ¹ / ₂	5/8	1 ¹ / ₂	5/8	5/8
CONTROLS						
Pressurestat Settings (psig)						
High Cutout	426 ± 7					
Cut-in	320 ± 20					
Low Cutout	7 ± 3					
Cut-in	22 ± 5					

LEGEND

NEMA — National Electrical Manufacturers Association

*Unit is factory supplied with holding charge only.

†Typical operating charge with 25 ft of interconnecting piping.

**Storage capacity of condenser coil with coil 80% full of liquid R-22 at 124 F.

NOTE: Unit 576B120 has one step of unloading. Full load is 100% of capacity, and one step of unloading is 67% capacity. Unit 576B120 has the following unloader settings: load is 70 ± 1 psig and unload is 60 ± 2 psig.

DIMENSIONS (ft.-in.)

UNIT	A	B	C	D	E	F
With Aluminum Coils (Standard)						
569C072	1-6 ¹ / ₂	1-2 ³ / ₄	—	1-2 ¹ / ₄	1-4 ⁵ / ₁₆	2-9 ⁵ / ₁₆
569C090	1-8	1-6 ¹ / ₂	2-9 ¹³ / ₁₆	1-3	2- ⁵ / ₁₆	3-5 ⁷ / ₁₆
569C120	1-9	1-8	2-0	1-3	2- ⁵ / ₁₆	3-5 ⁷ / ₁₆
576B090	1-6	1-4 ³ / ₄	2-9 ¹³ / ₁₆	1-3	2- ⁵ / ₁₆	3-5 ⁷ / ₁₆
576B102	1-7	1-5	2-9 ¹³ / ₁₆	1-3	2- ⁵ / ₁₆	3-5 ⁷ / ₁₆
576B120	1-7	1-5	2-9 ¹³ / ₁₆	1-3	2- ⁵ / ₁₆	3-5 ⁷ / ₁₆
With Copper Coils (Optional)						
569C072	1-8	1-3	—	1-2 ¹ / ₄	1-4 ⁵ / ₁₆	2-9 ⁵ / ₁₆
569C090	1-9 ¹ / ₂	1-6	2-9 ¹³ / ₁₆	1-3	2- ⁵ / ₁₆	3-5 ⁷ / ₁₆
569C120	1-10	1-7	2-0	1-3	2- ⁵ / ₁₆	3-5 ⁷ / ₁₆
576B090	1-7 ¹ / ₂	1-4 ¹ / ₂	2-9 ¹³ / ₁₆	1-3	2- ⁵ / ₁₆	3-5 ⁷ / ₁₆
576B102	1-7 ¹ / ₂	1-4	2-9 ¹³ / ₁₆	1-3	2- ⁵ / ₁₆	3-5 ⁷ / ₁₆
576B120	1-7 ¹ / ₂	1-4	2-9 ¹³ / ₁₆	1-3	2- ⁵ / ₁₆	3-5 ⁷ / ₁₆

ELECTRICAL CONNECTIONS

CONNECTION SIZES	
AA	1 ³ / ₈ " Dia Field Power Supply Hole
BB	2" Dia Power Supply Knockout
CC	2 ¹ / ₂ " Dia Power Supply Knockout
DD	7/8" Dia Field Control Wiring Hole

SERVICE VALVE CONNECTIONS

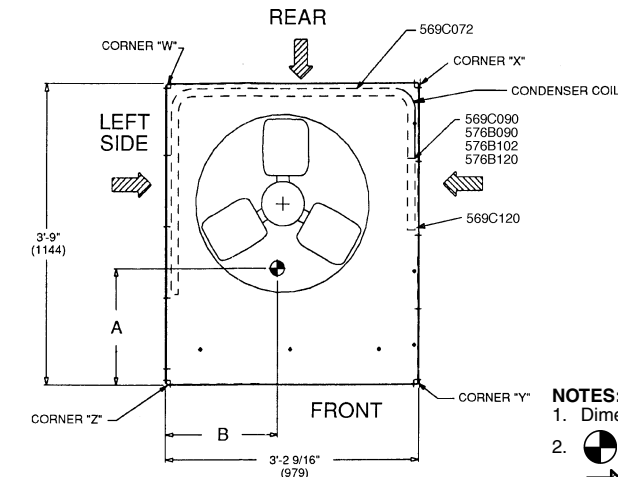
UNIT	SUCTION	LIQUID
569C072	1 ¹ / ₈ "	1 ¹ / ₂ "
569C090	1 ¹ / ₈ "	1 ¹ / ₂ "
569C120	1 ¹ / ₈ "	5/8"
576B090	1 ¹ / ₈ "	1 ¹ / ₂ "
576B102	1 ¹ / ₈ "	5/8"
576B120	1 ¹ / ₈ "	5/8"

WEIGHT CHART (lb)

UNIT	STD UNIT		CORNER W		CORNER X	
	Al	Cu	Al	Cu	Al	Cu
569C072	340	386	86	106	53	65
569C090	392	460	91	120	84	100
569C120	426	503	96	126	99	126
576B090	510	578	114	143	89	106
576B102	564	632	133	161	97	114
576B120	564	632	133	161	97	114

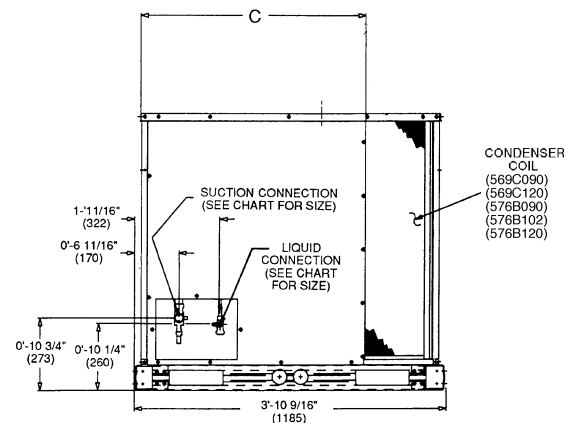
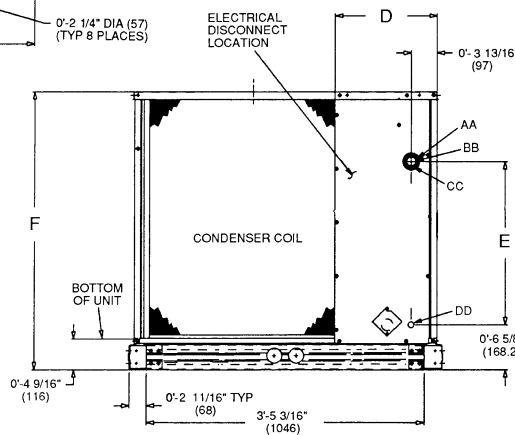
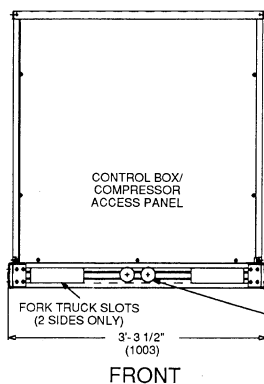
UNIT	CORNER Y		CORNER Z	
	Al	Cu	Al	Cu
569C072	77	82	124	133
569C090	105	113	113	127
569C120	117	127	113	127
576B090	133	142	173	187
576B102	141	150	193	207
576B120	141	150	193	207

NOTE: Al indicates weight with aluminum-fin coil (standard); Cu indicates weight with copper-fin coil (optional).



NOTES:

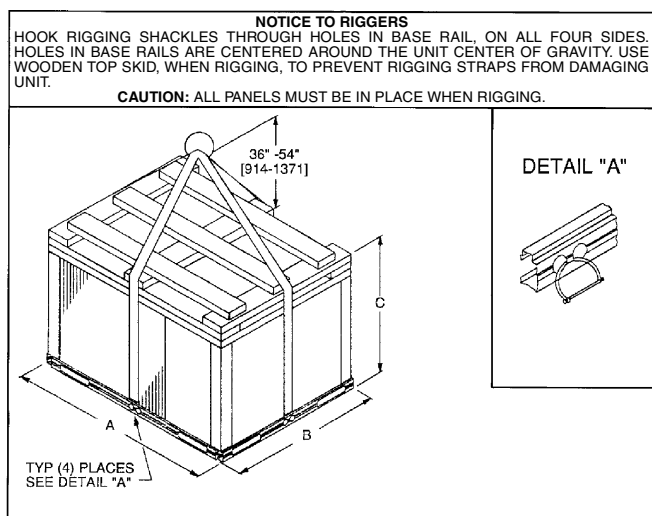
- Dimensions in [] are in millimeters.
- Center of Gravity. See chart for dimensions.
- Direction of airflow.
- Minimum clearance (local codes or jurisdiction may prevail):
 - Bottom to combustible surfaces, 0 inches.
 - Either left or rear side of condensing unit must have 36-in. clearance for proper airflow; the remaining side(s) must have 12-in. clearance each.
 - Overhead, 60 in., to assure proper condenser fan operation.
 - Between units, control box side, 42 in. per NEC (National Electrical Code).
 - Between unit and ungrounded surfaces, control box side, 36 in. per NEC.
 - Between unit and block or concrete walls and other grounded surfaces, control box side, 42 in. per NEC.
- With the exception of the clearance for the condenser coil as stated in Note 4b, a removable fence or barricade requires no clearance.
- Units may be installed on combustible floors made from wood or Class A, B, or C roof covering material.
- Certified dimension drawings available on request.



LEFT SIDE

RIGHT SIDE

Fig. 2 — Base Unit Dimensions



UNIT	RIGGING WEIGHT*		A		B		C	
	lb	kg	in.	mm	in.	mm	in.	mm
569C072	390	177	45.0	1143	38.5	978	35.5	904
569C090	420	192	45.0	1143	38.5	978	43.5	1105
569C120	445	203	45.0	1143	38.5	978	43.5	1105
576B090	560	255	45.0	1143	38.5	978	43.5	1105
576B102	614	280	45.0	1143	38.5	978	43.5	1105
576B120	614	280	45.0	1143	38.5	978	43.5	1105

*Weights are for aluminum coils.

Fig. 3 — Rigging Label

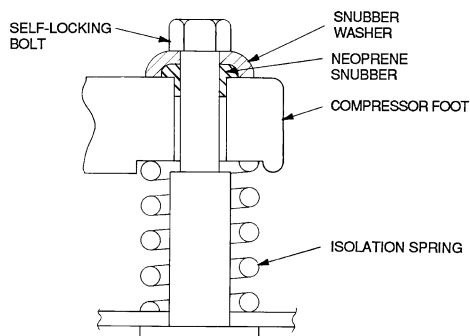


Fig. 4 — Typical Compressor Mounting (576B Units)

B. Filter Drier and Moisture Indicator

The filter drier is factory installed. Moisture indicator is a field-installed accessory and should be installed just after liquid line shutoff valve at the evaporator coil. *Do not use a receiver.* A receiver is not supplied with the unit and should not be used.

NOTE: Unit is shipped with R-22 holding charge. System pressure must be relieved before removing caps. Recover refrigerant prior to brazing.

Pass nitrogen or other inert gas through piping while brazing to prevent formation of copper oxide.

Install field-supplied thermostatic expansion valve(s) in evaporator section. It is **recommended** that a field supplied liquid line solenoid be positioned in the main liquid line (near the evaporator coil). It should be wired to close when compressor stops to minimize refrigerant migration during the "OFF" cycle.

Table 2 — Refrigerant Piping Sizes

LINEAR LENGTH OF PIPING — FT (M)								
UNIT	0-25 (0-7.6)		25-50 (7.6-15.2)		50-75 (15.2-22.9)		75-100 (22.9-30.5)	
	Line Size (in. OD)							
	L	S	L	S	L	S	L	S
569C072	1½	1⅞	1½	1⅞	1½	1⅞	1½	1⅞
569C090	1½	1⅞	1½	1⅞	5⁄8	1⅞	5⁄8	1¾
569C120	5⁄8	1⅞	5⁄8	1¾	5⁄8	1¾	5⁄8	1¾
576B090	1½	1⅞	1½	1⅞	5⁄8	1⅞	5⁄8	1¾
576B102	5⁄8	1⅞	5⁄8	1⅞	5⁄8	1¾	5⁄8	1¾
576B120	5⁄8	1⅞	5⁄8	1⅞	5⁄8	1¾	5⁄8	1¾

LEGEND

L — Liquid Line **S** — Suction Line

NOTES:

- Pipe sizes are based on a 2° F (1° C) loss for liquid and suction lines.
- Pipe sizes are based on the maximum linear length shown for each column, plus a 50% allowance for fittings.
- Charge units with R-22 in accordance with unit installation instructions.

Table 3 — Liquid Line Data

UNIT	MAX ALLOWABLE LIQUID LIFT		LIQUID LINE			
			Max Allowable Pressure Drop		Max Allowable Temp Loss	
	Ft	M	psi	kPa	F	C
569C072	86	26.2	7	48.3	2	1
569C090	60	18.3	7	48.3	2	1
569C120	70	21.3	7	48.3	2	1
576B090	60	18.3	7	48.3	2	1
576B102	65	19.8	7	48.3	2	1
576B120	65	19.8	7	48.3	2	1

NOTE: Values shown are for units operating at 45 F (7.2 C) saturated suction and 95 F (35 C) entering air.

V. ELECTRICAL CONNECTIONS

WARNING: The unit cabinet must have an uninterrupted, unbroken electrical ground to minimize the possibility of personal injury if an electrical fault should occur. This ground may consist of electrical wire connected to the unit ground lug in the control compartment or conduit approved for electrical ground when installed in accordance with the NEC and local electrical codes. Failure to adhere to this warning could result in personal injury.

CAUTION: Failure to follow these precautions could result in damage to the unit being installed:

A. Field Power Supply (Fig. 5-7)

- Make all electrical connections in accordance with NEC ANSI/NFPA (American National Standards Institute/ National Fire Protection Association) 70, latest edition, and local electrical codes governing such wiring. Refer to unit wiring diagram.
- Use only *copper or copper-clad* conductor fan connections between field-supplied electrical disconnect switch and unit. **DO NOT USE ALUMINUM WIRE.** Maximum wire size is no. 2 AWG (American Wire Gage).
- Voltage to compressor terminals during operation must be within voltage range indicated on unit nameplate (also see Table 4). On 3-phase units, voltages between phases must be balanced within 2% and

the current within 10%. Use the formula shown in Table 4, Note 2, to determine the percent voltage imbalance. Operation on improper line voltage or excessive phase imbalance constitutes abuse and may cause damage to electrical components. Such operation would invalidate any applicable warranty.

4. Insulate low-voltage wires for highest voltage contained within conduit when low-voltage control wires are run in same conduit as high-voltage wires.
5. Do not damage internal components when drilling through any panel to mount electrical hardware, conduit, etc.

All units except 208/230-v units are factory wired for the voltage shown on the nameplate. If the 208/230-v unit is to be connected to a 208-v power supply, the transformer *must* be rewired by moving the black wire from the 230-v terminal on the transformer and connecting it to the 200-v terminal on the transformer.

Refer to unit label diagram for additional information. Pigtails are provided for field wire connections. Use factory-supplied splices or UL (Underwriters' Laboratories) approved copper/aluminum connector.

When installing units, provide a disconnect per NEC. All field wiring must comply with NEC and local requirements.

Install field wiring as follows:

1. Install conduit through side panel openings.
2. Install power lines to terminal connections as shown in Fig. 5.

B. Control Voltage Connections

Install an accessory thermostat assembly according to installation instructions included with the accessory. Locate thermostat assembly on a solid wall in the conditioned space to sense average temperature in accordance with thermostat installation instructions.

Route thermostat cable or equivalent single leads of colored wire from subbase terminals to low-voltage connections on unit (shown in Fig. 6) as described in Steps 1 through 4 below.

NOTE: For wire runs up to 50 ft, use no. 18 AWG insulated wire (35 C minimum). For 50 to 75 ft, use no. 16 AWG

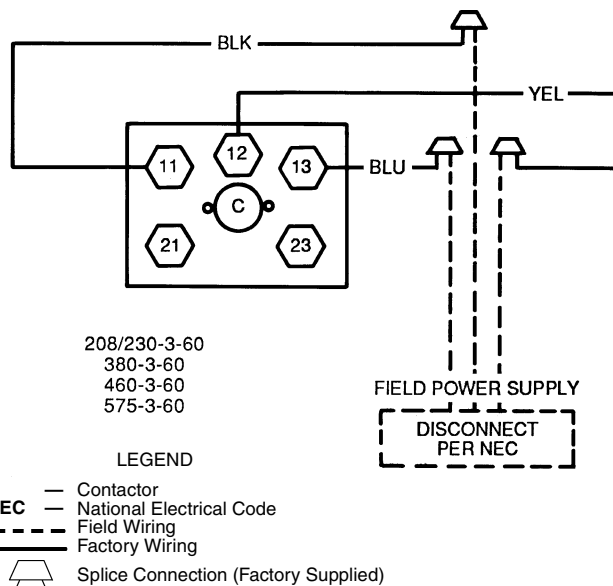


Fig. 5 — Power Wiring Connections

insulated wire (35 C minimum). For over 75 ft, use no. 14 AWG insulated wire (35 C minimum). All wire larger than no. 18 AWG cannot be directly connected to the thermostat and will require a junction box and splice at the thermostat.

1. Connect thermostat wires to screw terminals of low voltage connection board.
2. Pass the control wires through the hole provided in the corner post. See Fig. 7.
3. Feed wire through raceway built into the corner post and into the 24-v thermostat connection board. The 24-v thermostat connection is located on the left side of the low voltage connection compartment. The raceway provides the UL required clearance between the high- and low-voltage wiring.
4. Total combined amperage draw of the field-installed liquid line solenoid valve and indoor fan contactor must not exceed 22 va. If the specified va must be exceeded, use a remote relay to switch the load.

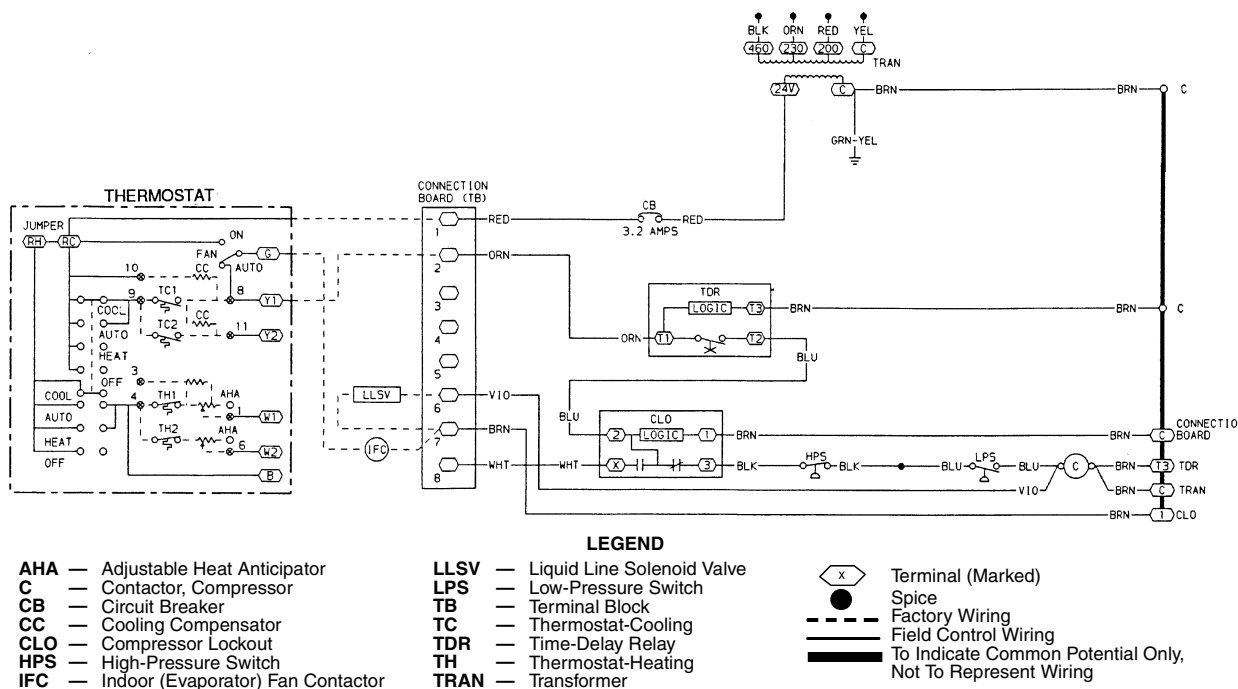


Fig. 6 — Typical Control Wiring Connections (569C Shown)

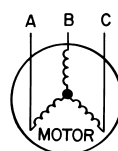
Table 4 — Electrical Data

UNIT	NOMINAL VOLTAGE (V-Ph-Hz)	VOLTAGE RANGE		COMPRESSOR		OFM	POWER SUPPLY	
		Min	Max	RLA	LRA	FLA	MCA	MOCP
569C072	208/230-3-60	187	254	21.8	158	1.9	30.1	40
	460-3-60	414	508	10.0	79	1.0	13.5	20
	575-3-60	518	632	9.0	65	1.9	14.1	20
569C090	208/230-3-60	187	254	28.8	195	3.8	39.8	50
	460-3-60	414	508	14.7	95	1.9	20.3	25
	575-3-60	518	632	10.8	80	1.9	15.4	20
569C120	208/230-3-60	187	254	37.8	239	3.1	51.1	70
	460-3-60	414	508	17.2	125	1.4	23.4	30
	575-3-60	518	632	14.3	90	1.4	19.8	25
576B090	208/230-3-60	187	254	31.5	160	3.1	42.5	50
	380-3-60	342	418	19.0	75	2.2	26.0	35
	460-3-60	414	508	15.7	80	1.4	21.0	25
	575-3-60	518	632	12.6	64	1.4	17.2	20
576B102	208/230-3-60	187	254	39.7	198	3.1	52.7	70
	380-3-60	342	418	24.0	93	2.2	32.2	40
	460-3-60	414	508	19.9	99	1.4	26.3	35
	575-3-60	518	632	15.9	79	1.4	21.3	25
576B120	208/230-3-60	187	254	39.7	198	3.1	52.7	70
	380-3-60	342	418	24.0	93	2.2	32.2	40
	460-3-60	414	508	19.9	99	1.4	26.3	35
	575-3-60	518	632	15.9	79	1.4	21.3	25

LEGEND

CSA	—	Canadian Standards Association
FLA	—	Full Load Amps
HACR	—	Heating, Air Conditioning and Refrigeration
LRA	—	Locked Rotor Amps
MCA	—	Minimum Circuit Amps
MOCP	—	Maximum Overcurrent Protection
NEC	—	National Electrical Code
OFM	—	Outdoor (Condenser) Fan Motor
RLA	—	Rated Load Amps
UL	—	Underwriters' Laboratories

EXAMPLE: Supply voltage is 460-3-60.



AB = 452 v
BC = 464 v
AC = 455 v

$$\begin{aligned}\text{Average Voltage} &= \frac{452 + 464 + 455}{3} \\ &= \frac{1371}{3} \\ &= 457\end{aligned}$$



(AB) 457 – 452 = 5 v
(BC) 464 – 457 = 7 v
(AC) 457 – 455 = 2 v

Maximum deviation is 7 v.

Determine percent of voltage imbalance:

$$\begin{aligned}\% \text{ Voltage Imbalance} &= 100 \times \frac{7}{457} \\ &= 1.53\%\end{aligned}$$

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.

IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.

3. The 575-v units are CSA only.

4. The 380-v units are *not* UL or CSA listed.

NOTES:

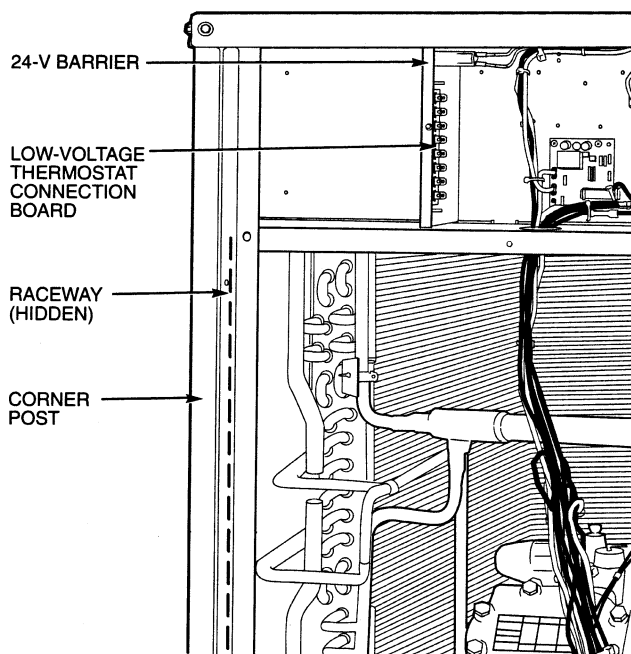
1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. The Canadian units may be fuse or circuit breaker.

2. **Unbalanced 3-Phase Supply Voltage**

Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percent of voltage imbalance.

% of Voltage Imbalance =

$$100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$



**Fig. 7 — Field Control Wiring Raceway
(576B Unit Shown)**

VI. ACCESSORY INSTALLATION

At this time any required accessories should be installed on the unit. Refer to Table 5 for available accessories. Control wiring information is provided in the unit wiring book.

Table 5 — Accessory List

ACCESSORY
Gage Panel
Winter-Start Relay Package
Weatherprobe™ II Low Ambient Kit
Hail Guard Package (072)
Hail Guard Package (090,102,120)
Thermostats
Subbase

PRE-START-UP

WARNING: Failure to observe the following warnings could result in serious personal injury:

1. Follow recognized safety practices and wear protective goggles when checking or servicing refrigerant system.
2. Do not operate compressor or provide any electric power to unit unless compressor terminal cover is in place and secured.
3. Do not remove compressor terminal cover until all electrical sources have been disconnected.
4. If refrigerant leak is suspected around compressor terminals, recover refrigerant whenever possible and relieve all pressure from system before touching or disturbing anything inside terminal box.
5. Never attempt to repair soldered connection while refrigerant system is under pressure.
6. Do not use torch to remove any component. System contains oil and refrigerant under pressure. To remove a component, wear protective goggles and proceed as follows:
 - a. Shut off electrical power to unit.
 - b. Recover refrigerant. Relieve all pressure from system.
 - c. Cut component-connecting tubing with tubing cutter and remove component from unit.
 - d. Carefully unsweat remaining tubing stubs when necessary. Oil can ignite when exposed to torch flame.

Proceed as follows to inspect and prepare the unit for initial start-up:

1. Field electrical power source must agree with unit nameplate rating.
2. Check voltage imbalance as shown in Table 4, Note 2.
3. Check that all internal wiring connections are tight and that all barriers, covers, and panels are in place.
4. Ensure all service valves are open. On 576B units, be sure all compressor service valves are backseated.
5. Verify that compressor holddown bolts have been loosened and that flat/snubber washers can be rotated by applying finger pressure (snug, but not tight).
6. On 569C and 576B units, verify compressor crankcase heater is securely in place. Crankcase heater must operate for a least 24 hours before start-up.
7. Note that compressor oil level is visible in the sight glass (576B units only).
8. Check for leaks in refrigerant system by using soap bubbles and/or electronic leak detector.
9. Check that liquid line solenoid valve is located at evaporator coil as shown in Filter Drier and Moisture Indicator section, page 5.
10. Check that both outdoor and indoor units are properly mounted in accordance with installation instructions and applicable codes.

START-UP

I. START-UP AND ADJUSTMENTS

⚠ CAUTION: Complete the required procedures given in the Pre-Start-Up section and unit start-up checklist at the end of this publication before starting the unit. Do not jumper any safety devices when operating the unit.

Do not operate the compressor when the outdoor temperature is below 25 F (24 C) (unless accessory low ambient kit is installed).

A. Checking Cooling Control Operation

Start and check the unit for proper cooling control operation as follows:

1. Place room thermostat SYSTEM switch in OFF position. Observe that blower motor starts when FAN switch is placed in ON position and shuts down when FAN switch is placed in AUTO. position.
2. Place SYSTEM switch in COOL position and FAN switch in AUTO. position. Set cooling control below room temperature. Observe that compressor and condenser- and evaporator-fan motors start. Observe that cooling cycle shuts down when control setting is satisfied.

B. Unit Controls

All units have the following internal-protection controls:

Compressor Overload

This overload interrupts power to the compressor when either the current or internal motor winding temperature become excessive, and automatically resets when the internal temperature drops to a safe level. This overload may require up to 60 minutes (or longer) to reset. If the internal overload is suspected of being open, disconnect the electrical power to the unit and check the circuit through the overload with an ohmmeter or continuity tester.

Time Guard® II Device

The unit is equipped with accessory Time Guard II recycle timer. The device will cause a 5-minute delay between compressor starts.

Cycle-LOC™ Device

When high-pressure or low-pressure fault occurs, the Cycle-LOC device will protect the system by not allowing the compressor to start.

Low-Pressure Switch/(LPS)

When the suction line pressure drops below 7 psig (48 kPa), the LPS opens 24-v power to the compressor contactor and stops the compressor. When the pressure reaches 22 psig (152 kPa), the switch resets and the compressor is allowed to restart.

High-Pressure Switch (HPS)

When the refrigerant high-side pressure reaches 426 psig (2937 kPa), the HPS opens 24-v power to the compressor contactor and stops the compressor. When the pressure drops to 320 psig (2206 kPa), the switch resets and the compressor is allowed to restart.

C. Sequence of Operation

At start-up, the thermostat calls for cooling. When all safety devices are satisfied, the compressor contactor (fan contactor) will energize causing the compressor and outdoor (condenser) fan motor to operate. Terminal "G" at the

thermostat is also energized, allowing the field-supplied and -installed (24v) indoor (evaporator) fan contactor to function. A field-supplied and -installed liquid line valve (connected between Terminals G and C at the outdoor unit), will also open. This allows the system to function in cooling; the LPS will not open if compressor is not running. As cooling demand is satisfied, the thermostat contacts break, deenergizing the contactor causing the system to shut off. The liquid line solenoid (LLS) valve closes, minimizing the potential for refrigerant migration at this time. The compressor does not restart until the thermostat again calls for cooling. If a demand for cooling occurs within 5 minutes after the thermostat is satisfied, the system will not restart due to the feature of Time Guard II device. After the 5-minute time period, the system will restart as normal upon thermostat demand.

The system is protected with a Cycle-LOC device so that the compressor will not start if a high-pressure or low-pressure fault occurs. To reset the Cycle-LOC device, set the thermostat to eliminate the cooling demand then return to the original set point. This should be done only once, and if system shuts down due to the same fault, determine the problem before attempting to reset the Cycle-LOC device.

The crankcase heaters must be energized for a minimum of 24 hours before starting a 569C and 576B unit.

D. Oil Charge

576B Units

Allow unit to run for about 20 minutes. Stop unit and check compressor oil level. Add oil only if necessary to bring oil into view in sight glass. *Use only approved compressor oil.*

Approved oils are:

Suniso 3GS
WF32-150

If oil is added, run unit for an additional 10 minutes. Stop unit and check oil level. If level is still low, add oil *only after* determining that piping system is designed for proper oil return and that system is not leaking oil.

569C Units

The 569C units do not have a sight glass and are factory charged with the correct amount of oil.

All Units

Do not reuse drained oil or use any oil that has been exposed to the atmosphere. Procedures for adding or removing oil are given in the Standard Service Techniques Manual, Chapter 1, Refrigerants.

CARE AND MAINTENANCE

To ensure continuing high performance and to minimize the possibility of premature equipment failure, periodic maintenance must be performed on this equipment. This cooling unit should be inspected at least once each year by a qualified service person.

NOTE TO EQUIPMENT OWNER: Consult your local dealer about the availability of a maintenance contract.

⚠ WARNING: The ability to properly perform maintenance on this equipment requires certain expertise, mechanical skills, tools, and equipment. If you do not possess these, do not attempt to perform any maintenance on this equipment other than those procedures recommended in the User's Manual. **FAILURE TO HEED THIS WARNING COULD RESULT IN SERIOUS PERSONAL INJURY AND POSSIBLE DAMAGE TO THIS EQUIPMENT.**

SERVICE

WARNING: When servicing unit, shut off all electrical power to unit to avoid shock hazard or injury from rotating parts.

I. CLEANING

Inspect unit interior at the beginning of each cooling season and as operating conditions require.

A. Condenser Coil

Inspect coil monthly. Clean condenser coil annually, or as required by location and outdoor-air conditions.

Clean coil as follows:

1. Turn off unit power and tag disconnect.
2. Remove and save top panel screws on condensing unit.
3. Remove condenser coil corner post. See Fig. 8. To hold top panel open, place coil corner post between top panel and side panel. See Fig. 9.
4. Remove bracket holding coil sections together at return end of condenser coil. Carefully separate the outer coil section 3 to 4 in. from the inner coil section. See Fig. 10.
5. Use a water hose or other suitable equipment to flush down between the 2 coil sections to remove dirt and debris. Clean the outer surfaces with a stiff brush in the normal manner.
6. Reposition the outer coil section, attach the bracket removed in Step 4, and remove the coil corner post from between the top panel and side panel. Secure the sections together. Install the coil corner post and replace all screws (removed in Step 2).

II. LUBRICATION

A. Compressors

Each compressor is charged with the correct amount of oil at the factory. Refer to the Oil Charge section on page 9 for additional information.

B. Fan Motor Bearings

Fan motor bearings are of the permanently lubricated type. No further lubrication is required.

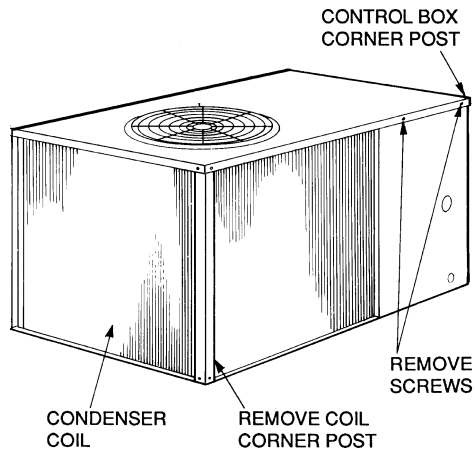


Fig. 8 — Cleaning Condenser Coil

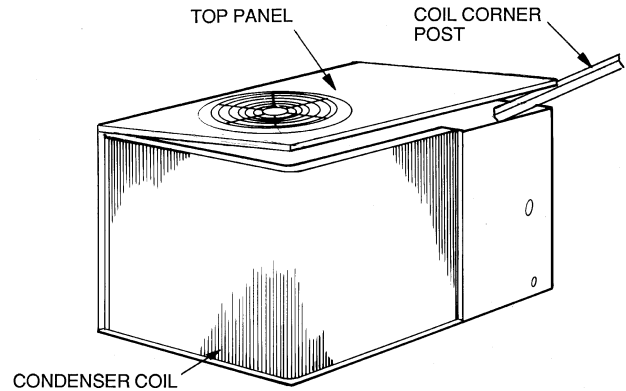


Fig. 9 — Propping Up Top Panel

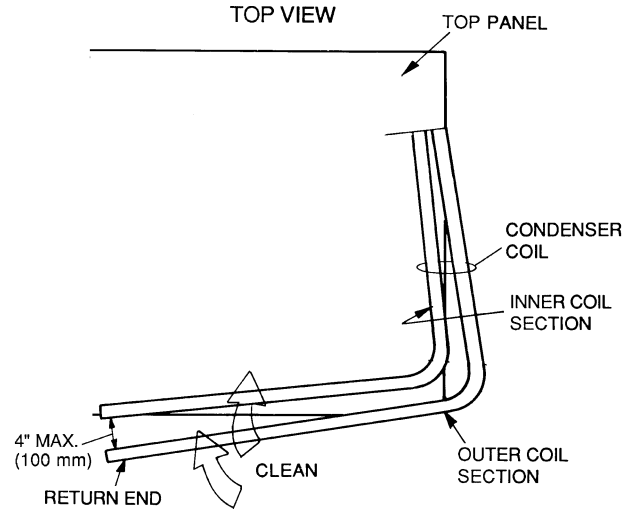
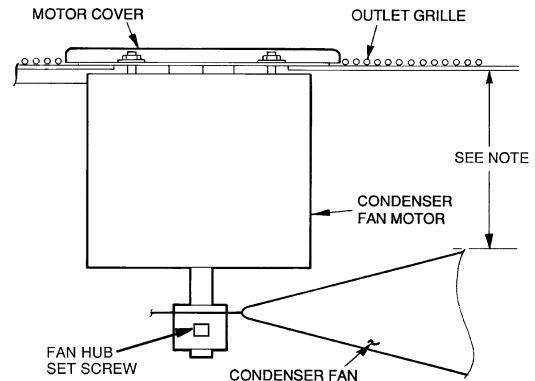


Fig. 10 — Separating Coil Sections

III. CONDENSER-FAN ADJUSTMENT (Fig. 11)

1. Shut off unit power supply, and tag disconnect.
2. Remove condenser-fan assembly (grille, motor, motor cover, and fan).
3. Loosen fan hub setscrews.
4. Adjust fan height as shown in Fig. 11.
5. Tighten set screws.
6. Replace condenser-fan assembly.



NOTE: Fan height adjustments are as follows:

UNIT	in.	mm
569C072	4.50	114
All Units (except 569C072)	6.42	163

Fig. 11 — Outdoor (Condenser) Fan Adjustment

IV. CAPACITY CONTROL (576B120 Only)

A suction pressure-actuated unloader controls 2 cylinders and provides capacity control. Unloaders are factory set (see Table 1), but may be field adjusted:

A. Control Set Point

The control set point (cylinder load point) is adjustable from 0 to 85 psig. To adjust, turn control set point adjustment nut (Fig. 12) clockwise to its bottom stop. In this position, set point is 85 psig. Then, turn adjustment counterclockwise to desired control set point. Every full turn counterclockwise decreases set point by 7.5 psig.

B. Pressure Differential

The pressure differential (difference between cylinder load and unload points) is adjustable from 6 to 22 psig. To adjust, turn pressure differential adjustment screw (Fig. 12) counterclockwise to its back stop position. In this position, differential is 6 psig. Then, turn adjustment screw clockwise to desired pressure differential. Every full turn clockwise increases differential by 1.5 psig.

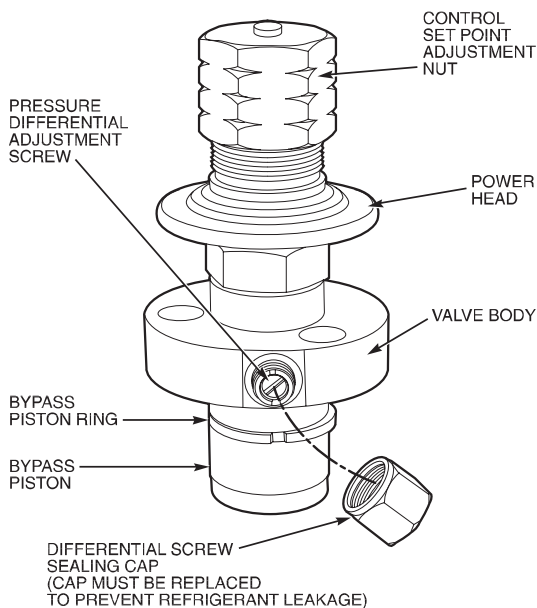


Fig. 12 — Compressor Capacity Control Unloader

V. COMPRESSOR REMOVAL

See Table 1 for compressor information.

Follow safety codes and wear safety glasses and work gloves.

1. Shut off power to unit and install lockout. Remove unit access panel (front of unit).
2. Remove refrigerant from system using refrigerant removal methods described in GTAC II, Module 5, Charging, Recovery, Recycling, and Reclamation.
3. Disconnect compressor wiring at compressor terminal box.
4. Remove bolts from suction flange and discharge service valve (576B units).

CAUTION: Excessive movement of copper lines at compressor may cause higher levels of vibration when unit is restored to service.

5. Remove crankcase heater from compressor base (576B units only).
6. Remove compressor holddown bolts.

7. Remove compressor from unit.
8. Clean system. Add new liquid line filter drier.
9. Install new compressor in unit.
10. Connect suction and discharge lines to compressor. Ensure that compressor holddown bolts are in place.
11. Install crankcase heater.
12. Connect wiring.
13. Evacuate and recharge unit, per Step VII.
14. Restore unit power.

VI. CRANKCASE HEATER

The crankcase heater prevents refrigerant migration and compressor oil dilution during shutdown when compressor is not operating.

Close both compressor service valves if applicable when crankcase heater is deenergized for more than 6 hours.

VII. REFRIGERANT CHARGE

Unit panels must be in place when unit is operating during charging procedure. Unit is shipped with a holding charge only. Weigh in 7 lbs of R-22 to start unit. Refer to GTAC II, Module 5, Charging, Recovery, Recycling, and Reclamation for additional information.

See Troubleshooting Guide on page 13 for additional information.

A. Low Charge Cooling

Using Cooling Charging Charts, Fig. 13 and 14, vary refrigerant until the conditions of the appropriate chart are met. Note the charging charts are different from type normally used. The charts are based on charging the units to the correct sub-cooling for the various operating conditions. Accurate pressure gage and temperature sensing device are required.

Connect the pressure gage to the service port on the liquid line service valve. Mount the temperature sensing device on the liquid line, close the liquid line service valve, and insulate it so that outdoor ambient temperature does not affect the reading. Indoor-air cfm must be within the normal operating range of the unit.

Operate unit a minimum of 15 minutes. Ensure that temperature and pressure have stabilized. Plot liquid pressure and temperature on chart and add or reduce charge as required. Do not vent refrigerant to the atmosphere. Recover any excess charge. Operate the unit until the system stabilizes. Adjust charge to conform with charging chart, using liquid pressure and temperature to read chart.

B. Refrigerant Leaks

Proceed as follows to repair a refrigerant leak and to charge the unit:

1. Locate the leak and ensure that refrigerant system pressure has been relieved.
2. Repair leak following accepted practices.

NOTE: Install a new filter drier in the liquid line whenever the system has been opened for repair.

3. Add a small charge of R-22 refrigerant vapor to system and leak-test unit.
4. Evacuate refrigerant system up to 500 microns. If additional leaks are not found.
5. Charge unit with R-22 refrigerant.

NOTE: Do not vent refrigerant to the atmosphere. Recover any excess charge.

VIII. REFRIGERANT SERVICE PORTS

Each unit has 3 service ports: one on the suction line, one on the liquid line, and one on the compressor discharge line. Be sure caps on the ports are tight.

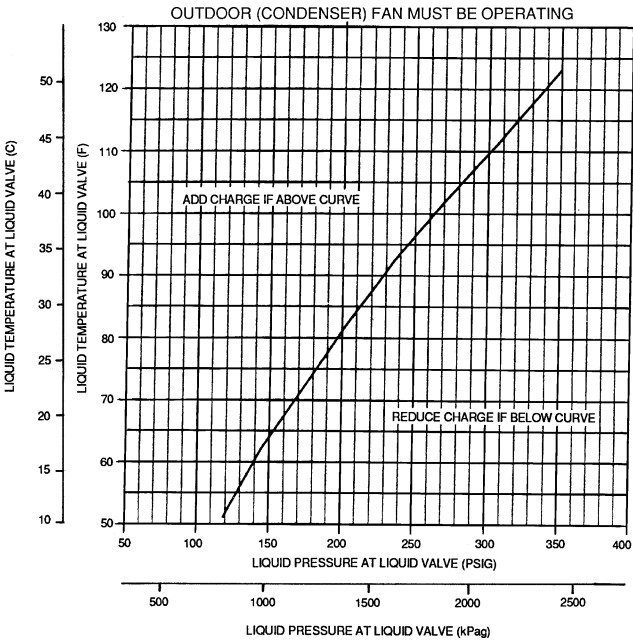


Fig. 13 — Cooling Charging Chart — 569C072

IX. HIGH FLOW VALVES

Located on the compressor hot gas and suction tubes are High Flow Valves. Large black plastic caps distinguish these valves with O-rings located inside the caps. These valves can not be accessed for service in the field. Ensure the plastic caps are in place and tight or the possibility of refrigerant leakage could occur.

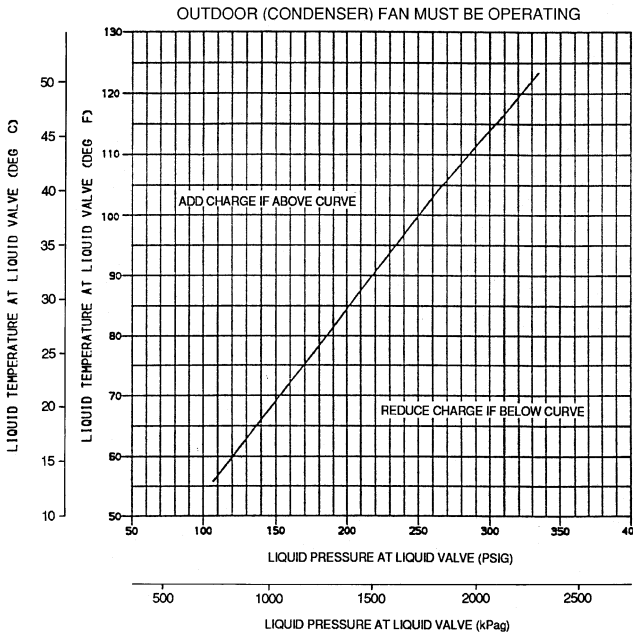


Fig. 14 — Cooling Charging Chart — 569C090, 120 and 576B090,102,120

TROUBLESHOOTING GUIDE






SYMPTOM	CAUSE	REMEDY
Compressor does not run — Contactor open	Power off.	Restore power.
	Fuses blown.	Replace with correct fuses after finding cause and correcting.
	Transformer open/shorted.	Replace transformer if primary windings are receiving power and no output.
	Thermostat circuit open.	Check thermostat setting.
	Low-pressure switch open.	Check for refrigerant undercharge or system leak.
	High-pressure switch open.	Check for refrigerant over charge or obstruction of outdoor airflow.
	Connections loose.	Tighten all connections.
	Compressor motor thermostat open.	Check for excessive motor temperature.
Compressor does not run — Contactor closed	Compressor leads loose, broken.	Check connections with power off.
	Single phasing.	Replace blown fuse.
	Compressor internal overload open.	Allow compressor motor windings to cool down to reset overload. Determine cause for overload opening.
Compressor cycles on high- pressure switch — Condenser fan on	High-pressure switch faulty.	Replace switch.
	Airflow restricted. Dirty coil.	Remove obstruction, clean condenser coil.
	Air recirculating.	Clear airflow area.
	Noncondensables in system.	Recover, evacuate and recharge as required. Refer to Carrier GTAC-II, Module 5, Charging, Recovery, Recycling, and Reclamation.
	Refrigerant overcharge.	Recover as required.
	Refrigerant system restrictions.	Check or replace filter drier, expansion valve, etc.
Compressor cycles on high- pressure switch — Condenser fan off	Fan slips on shaft.	Tighten fan hub screws.
	Motor not running.	Check power and capacitor $\frac{1}{3}$ and $\frac{3}{4}$ hp motor.
	Motor bearings seized.	Replace motor.
	Motor overload open.	Check overload rating. Check for fan blade obstruction.
	Motor burned out, windings open.	Replace motor.
Compressor cycles on low- pressure switch — Evaporator fan running	Filter drier plugged.	Replace filter drier.
	Expansion valve power head defective.	Replace power head.
	Low refrigerant charge.	Find leak, repair, evacuate system, and recharge.
	Expansion valve restricted/plugged.	Remove and replace expansion valve.
Airflow restricted — Low suction pressure	Evaporator coil iced up.	Check refrigerant charge.
	Evaporator coil dirty.	Clean coil fins.
	Indoor-air filter dirty.	Clean or replace filters.
	Indoor-air dampers closed.	Check damper operation and position.
Indoor (evaporator) fan stopped — Low suction pressure	Electrical connections loose.	Tighten all connections.
	Fan relay defective.	Replace relay.
	Motor overload open.	Check power supply.
	Motor defective.	Replace motor.
	Fan belt broken or slipping.	Replace or tighten belt.
Compressor runs but cooling insufficient — Suction pressure low	Refrigerant charge low.	Add charge.
	Head pressure low.	Check refrigerant charge.
	Indoor-air filters dirty.	Clean or replace filters.
	Expansion valve power head defective.	Replace power head.
	Expansion valve restricted/plugged.	Remove and replace expansion valve.
	Evaporator coil partially iced.	Check low-pressure setting.
	Evaporator airflow restricted.	Remove obstruction.
Compressor runs but cooling insufficient — Suction pressure high	Heat load excessive.	Check for open doors or windows.

NOTE: See Fig. 15 and 16 for component arrangements.

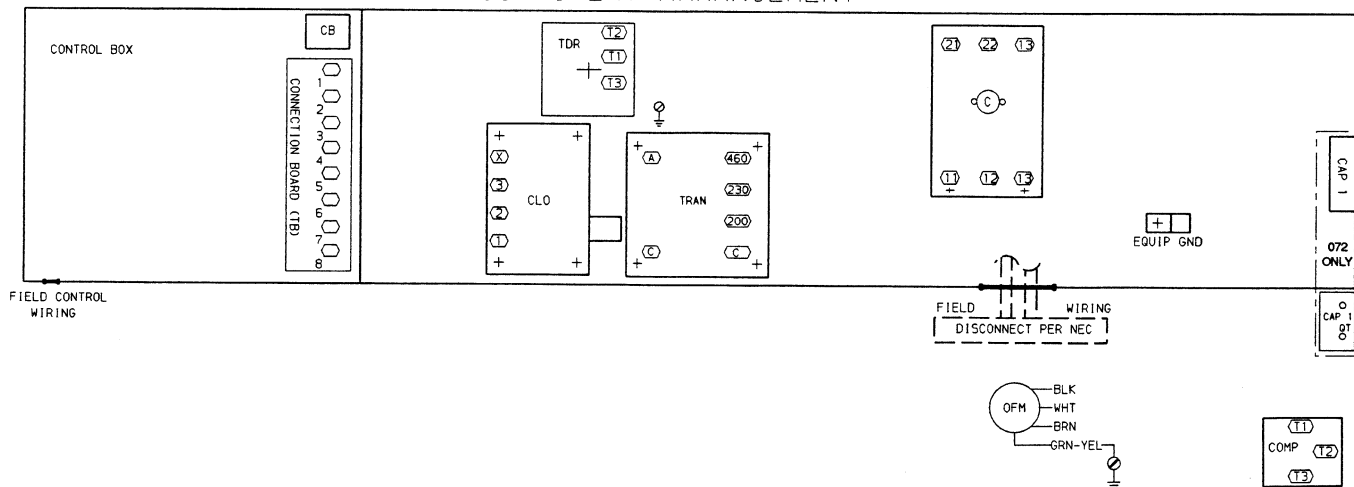
LEGEND FOR FIG. 15 AND 16

C — Contactor, Compressor
CAP — Capacitor
CB — Circuit Breaker
CH — Crankcase Heater
CLO — Compressor Lockout
COMP — Compressor Motor
COTP — Compressor Temperature Protection
EQUIP — Equipment
GND — Ground
HPS — High-Pressure Switch

LPS — Low-Pressure Switch
NEC — National Electrical Code
OFC — Outdoor (Condenser) Fan Contactor
OFM — Outdoor (Condenser) Fan Motor
OL — Overload Relay
QT — Quadruple Terminal
TB — Terminal Block
TDR — Time-Delay Relay
TRAN — Transformer

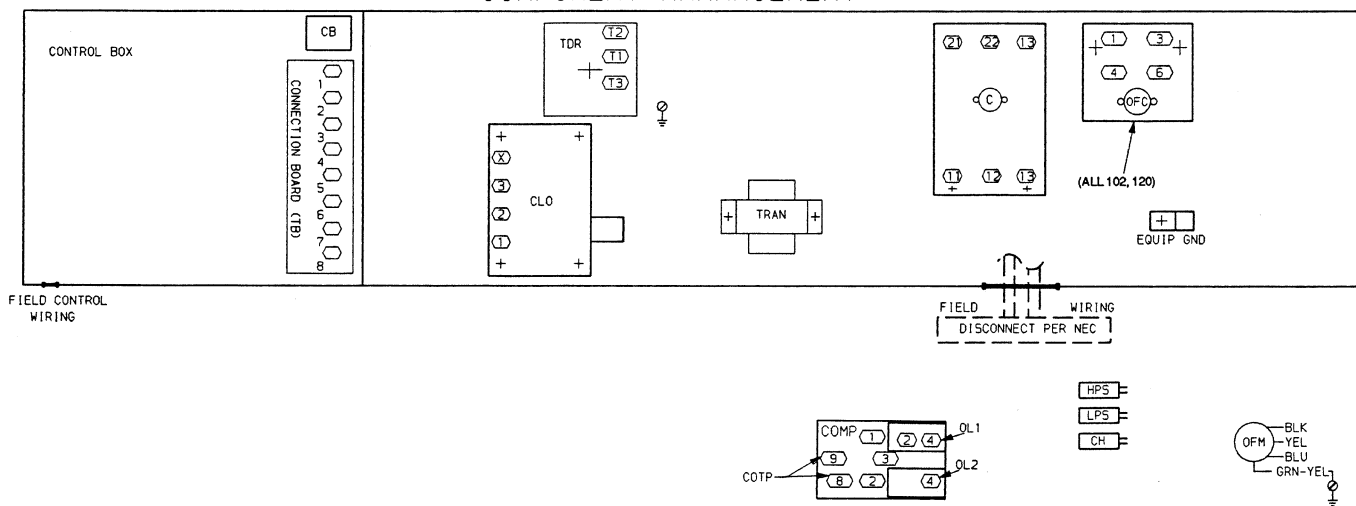
 Terminal (Marked)
 Terminal (Unmarked)
 Terminal Block
 Factory Wiring
 Field Power Wiring

COMPONENT ARRANGEMENT



→ Fig. 15 — Typical 569C Component Arrangement

COMPONENT ARRANGEMENT



→ Fig. 16 — Typical 576B Component Arrangement

START-UP CHECKLIST

I. PRELIMINARY INFORMATION

OUTDOOR: MODEL NO. _____ SERIAL NO. _____
INDOOR: AIR HANDLER MANUFACTURER _____
MODEL NO. _____ SERIAL NO. _____
ADDITIONAL ACCESSORIES _____

II. PRE-START-UP

OUTDOOR UNIT

IS THERE ANY SHIPPING DAMAGE? _____ (Y/N) _____

IF SO, WHERE: _____

WILL THIS DAMAGE PREVENT UNIT START-UP? (Y/N) _____

CHECK POWER SUPPLY. DOES IT AGREE WITH UNIT? (Y/N) _____

HAS THE GROUND WIRE BEEN CONNECTED? (Y/N) _____

HAS THE CIRCUIT PROTECTION BEEN SIZED AND INSTALLED PROPERLY? (Y/N) _____

ARE THE POWER WIRES TO THE UNIT SIZED AND INSTALLED PROPERLY? (Y/N) _____

HAVE COMPRESSOR HOLDDOWN BOLTS BEEN LOOSENEED, WHERE APPLICABLE (Snubber washers are snug, but not tight)?
(Y/N) _____

CONTROLS

ARE THERMOSTAT AND INDOOR-FAN CONTROL WIRING

CONNECTIONS MADE AND CHECKED? (Y/N) _____

ARE ALL WIRING TERMINALS (including main power supply) TIGHT? (Y/N) _____

HAS CRANKCASE HEATER BEEN ENERGIZED FOR 24 HOURS? (Y/N) _____

INDOOR UNIT

HAS WATER BEEN PLACED IN DRAIN PAN TO CONFIRM PROPER DRAINAGE? (Y/N) _____

ARE PROPER AIR FILTERS IN PLACE? (Y/N) _____

HAVE FAN AND MOTOR PULLEYS BEEN CHECKED FOR PROPER ALIGNMENT? (Y/N) _____

DO THE FAN BELTS HAVE PROPER TENSION? (Y/N) _____

HAS CORRECT FAN ROTATION BEEN CONFIRMED? (Y/N) _____

PIPING

IS LIQUID LINE SOLENOID VALVE LOCATED AT THE EVAPORATOR COIL AS REQUIRED? (Y/N) _____

HAVE LEAK CHECKS BEEN MADE AT COMPRESSOR, CONDENSER, EVAPORATOR,
TXVs (Thermostatic Expansion Valves), SOLENOID VALVES, FILTER DRIERS, AND FUSIBLE PLUGS
WITH A LEAK DETECTOR? (Y/N) _____

LOCATE, REPAIR, AND REPORT ANY LEAKS. _____

ARE ALL 576B COMPRESSOR SERVICE VALVES FULLY OPENED (BACKSEATED)?
(Y/N) _____

HAVE LIQUID LINE SERVICE VALVE AND SUCTION LINE SERVICE VALVE BEEN OPENED? (Y/N) _____

IS THE OIL LEVEL IN COMPRESSOR CRANKCASE ON 576B UNIT IN VIEW IN THE COMPRESSOR SIGHT GLASS?
(Y/N) _____

CHECK VOLTAGE IMBALANCE

LINE-TO-LINE VOLTS: AB _____ V AC _____ V BC _____ V

$(AB + AC + BC)/3 = \text{AVERAGE VOLTAGE} = V$

MAXIMUM DEVIATION FROM AVERAGE VOLTAGE = _____ V

VOLTAGE IMBALANCE = $100 \times (\text{MAX DEVIATION})/(\text{AVERAGE VOLTAGE}) = \text{ } \%$

IF OVER 2% VOLTAGE IMBALANCE, DO NOT ATTEMPT TO START SYSTEM!
CALL LOCAL POWER COMPANY FOR ASSISTANCE.

III. START-UP

CHECK EVAPORATOR-FAN SPEED AND RECORD. _____

CHECK CONDENSER-FAN SPEED AND RECORD. _____

AFTER AT LEAST 15 MINUTES RUNNING TIME, RECORD THE FOLLOWING MEASUREMENTS:

- OIL PRESSURE (576B only) _____
- SUCTION PRESSURE _____
- SUCTION LINE TEMP _____
- DISCHARGE PRESSURE _____
- DISCHARGE LINE TEMP _____
- ENTERING CONDENSER-AIR TEMP _____
- LEAVING CONDENSER-AIR TEMP _____
- EVAP ENTERING-AIR DB (dry bulb) TEMP _____
- EVAP ENTERING-AIR WB (wet bulb) TEMP _____
- EVAP LEAVING-AIR DB TEMP _____
- EVAP LEAVING-AIR WB TEMP _____

COMPRESSOR AMPS (L1/L2/L3) _____ / _____ / _____

HAS REFRIGERANT CHARGE BEEN ADJUSTED PER UNIT CHARGING CHART? _____

NOTES:

CUT ALONG DOTTED LINE

CUT ALONG DOTTED LINE